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Poisonous Plants of the Range

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Much interest has been taken in recent years in regard to a knowledge of poisonous plants of the range. The subject of poisonous plants is not new, for the word toxicology is derived from the ancient word "tox", meaning bow or arrow, probably from the ancient use of the arrow to kill. The North American Indians were quite familiar with many poisonous plants. The uncivilized races of Africa and other parts of the world are more or less familiar with many poisonous plants. While the ancients were familiar with poisonous plants, their knowledge was crude. They knew that opium, hyoscyamus, conium, aconite, and peach seed were poisonous. Precise knowledge of poisons could only be gained at the close of the eighteenth century and the beginning of the nineteenth when chemistry had advanced far enough to identify some of the poisons. During this time a number of most important treatises were published dealing with poisonous plants. The works of Gmelin, Bulliard, Plenck, Buchner, Orfila, Ratzeburg, and others, published splendidly illustrated volumes on poisonous plants.

Thousands of persons and large numbers of cattle and other livestock have been poisoned by various plants. The interest and its importance to live stock in the United States have been emphasized in treatises by Chesnut, Wilcox, the writer, and other investigators. Chesnut and Wilcox, in one of their treatises on poisonous plants, state that in the year 1900, 9,725 sheep were poisoned of which 3,331 died, 147 cattle were poisoned of which 90 died, 154 horses were poisoned and 6 died, from various poisonous plants. In the aggregate a large number of animals are annually poisoned on the range. It is, therefore, important that all persons dealing with the range and in particular the forester, who is being called more and more to take charge of the grazing in the forest reserve, should have some knowledge of the injurious plants of the forest ranges.*

*—According to a recent bulletin on lark spur or "poison weed" by Marsh Clawson the loss of cattle in the forest reserves is from 3-5 per cent.

Let me say that we must consider poisonous plants from the standpoint of strongly toxic to mildly toxic. Many plants are toxic to some animals and not to others. To illustrate, the rabbit can stand more morphin than man. Rats are quite immune to many poisons. The larkspurs are apparently much more tixic to bovine animals than to sheep. Sheep may eat considerable green hellebore though these same animals are quite sensitive to the bulb of the camas plant. Quite recently a correspondent wrote me that his cattle fed with impunity on a species of horsetail (*Equisetum robustum*) though it is known that young horses are quite susceptible to poisoning from the dried horsetail (*Equisetum arvense*). We know that individuals also may become accustomed to the use of poisons. Opium is a well known illustration. A small dose is injurious to children and comparatively small doses to persons who are not accustomed to its use, but large doses may be taken by those who habitually use it.

Another point in connection with poisons is how it enters the system. Certain poisons like curare are inert when taken into the intestinal tract because they are quickly excreted. Spaotoxin is converted into a non-poisonous substance within the intertines. Amygdalin from the cherry, when taken internally is converted into a most powerful poison, hydrocyanic acid. A plant may be more toxic at some times of the year than others. As an illustration, the roots of cowbane are not strongly toxic during the summer months, but when the roots are mature, and during the fall, winter, and spring, are powerfully toxic.

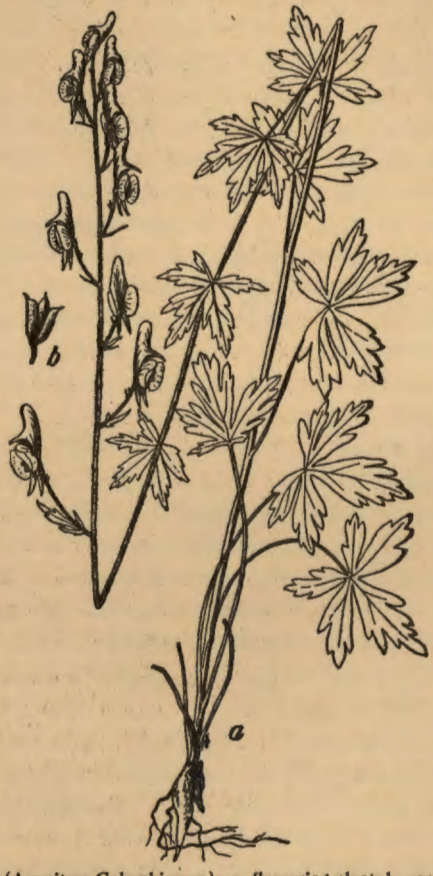
Poisonous plants are variously scattered through the different families of plants. We know that some of the most powerful poisons produced by plants occur among the bacteria. I need only remind you of the powerful toxins produced by the saprophytic and parasitic bacteria. Take the toxin produced by the bacterium found in old sausage, the *Baccilus botulinus;* rabbins will succumb to the injection on 0.0003-0.001 cc. Fungi like toadstools, represented by the fly agaric (*Amanita muscaria*) and the deadly Amanita (*Amanita phalloides*) and many other fungi of this class are deadly poisonous. Ergot caused by a parasitic fungus (*Claviceps purpurea*) and common on many grasses produces a number of most poisonous substances. Some of the ferns are poisonous. Among the grasses which on the whole are valuable forage plants, there are a number of poison-

ous plants, like sleepy grass (*Stipa robusta*) which is common on the range, in Colorado, New Mexico, and Texas. Aside from this species there are few other poisonous grasses in the United States, except millet and corghum. The latter contains a glucoside which is converted into hydrocyanic acid. Stipas, like *S. comata,* because of their sharp pointed callus and wild barley (*Hordeum jubatum*) produce mechanical injuries. The barleys are all troublesome because the awns work into the gums and cause inflammation and pus formation, due to the invasion of pus organisms.

Among the members of the Lily Family (*Liliaceae*) there are some very common plants on the range which are considered poisonous; nearly every rancher of the west knows the camas plant (*Zygadenus*). The death camas plant (*Zygadenus venenosus*) is one of the most widely distributed of the genus in the west. Other species are regarded as poisonous, like *Zygadenus chloranthus* and the wild sago (*Zygadenus paniculatus*). The camas plant is closely related to the bunch flower (*Melanthium virginicum*), an eastern species, and the skunk cabbage, green or California hellebore (*Veratrum californicum*). This plant is very common in moist springy places and near brooks at various altitudes in the Rocky Mountains. I have seen it in the vicinity of Salt Lake at 4,800 feet and again in the Uintah, Logan, and San Miguel Mountains at 8,500 feet. Curiously enough, quite a number of allied plants like sabadilla of Mexico and colchicum of Europe, allied to these plants, are also very poisonous. Recently the Wyoming Station reports toxic alkaloids in the camas plant. It should be noted in passing that sheep sometimes eat the hellebore, occasionally without poisoning them.

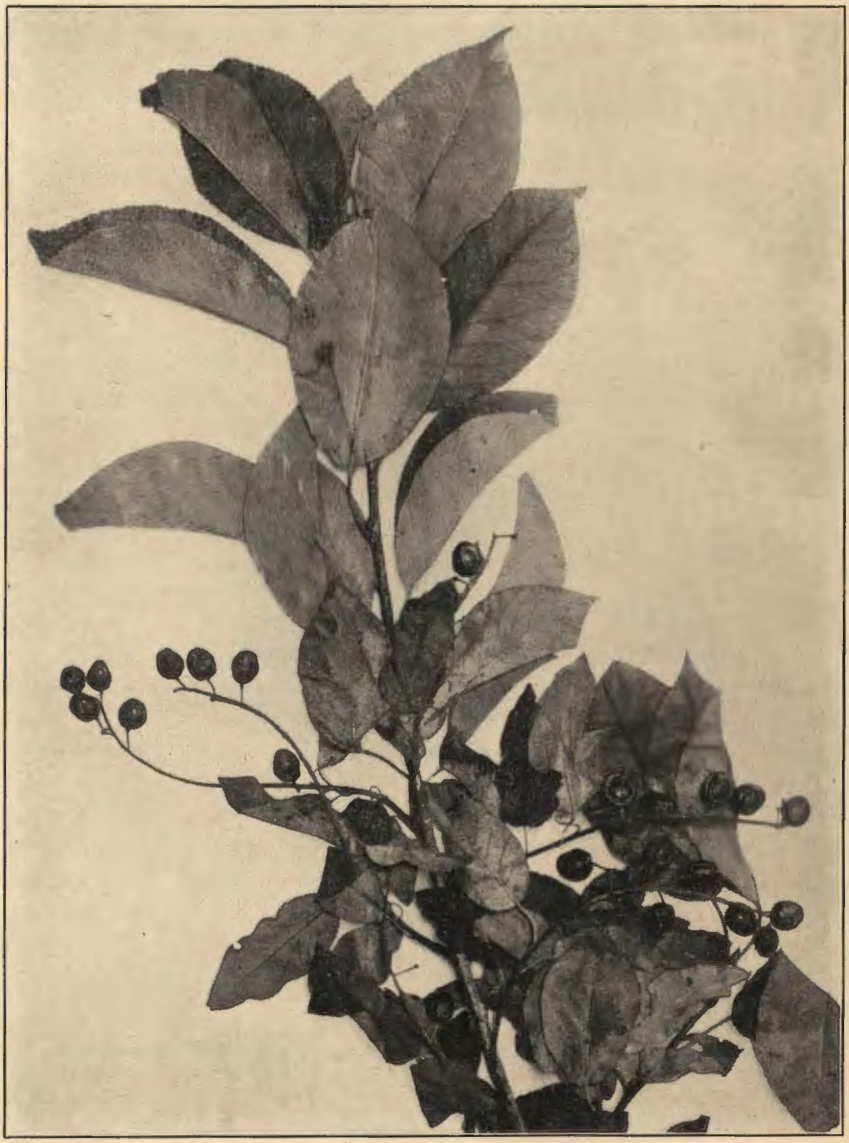
Of the Pink Family there are a number of poisonous plants, some of which are well known, like the corn cockle (*Agrostemma Githago*) which is a plant of the wheat field. Many of the plants of this family contain saponin like substances. These substances when shaken with water froth like soap. The saponin possesses a sharp burning taste. The seeds of the cockle and some allied plants are cerebro spinal irritants. There are many plants of this family in the forest reserves of the Rocky Mountains, but observation is lacking on the poisonous nature of these plants. Among the plants of this family on the range mention may be made of several species of *Arenaria, Silene,* etc.

The Crowfoot Family (*Ranunculaceae*) contains such plants as the columbine (*Aquilegia caerulea*) which is common in Colorado, Utah, New Mexico, etc. This is a familiar plant to most persons who are acquainted with the forests of the Rockies. This plant is slightly acrid, and is mentioned here only because so common and familiar and as representing the character of the family. The marigolds (*Caltha*) have long been recognized as poisonous. One species, the *Caltha leptosepala*, is common near



Western Aconite (Aconitum Columbianum); a, flowering plant; b, seed capsule. Mountain regions of the Rockies.—U. S. Dept. of Agriculture.

springs and running brooks at timber line. The western aconite (*Aconitum columbianum*) or sometimes called Monks-hood, because the flowers have the shape of a monk's-hood. The flowers



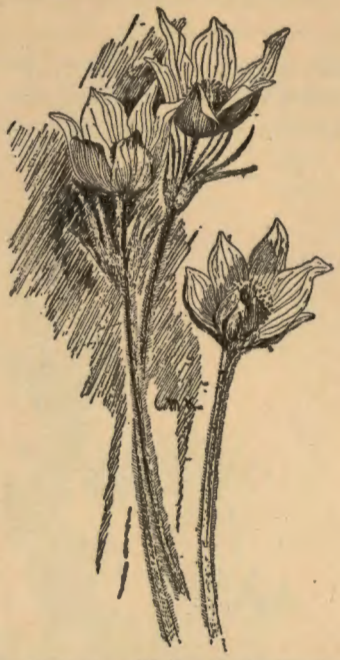
Western Wild Cherry (Prunus demissa). Common throughout the Rocky Mountains—Photo by Colburn

are purplish or white, leaves deeply divided. This plant, like the European monks-hood, contains several poisonous alkaloids. The aconite is, of course, closely related to larkspur of which there are several species in the Rocky Mountains. One of the blue-flowered larkspurs with spurred ble flowers is known as *Delphinium Nelsoni.* I have described seven species which are

Smooth Larkspur (Delphinium glaucum) of the Pacific Coast. A representative of the poisonous larkspurs. Chesnut, U. S. Dept. Agr.)

considered poisonous in my Manual of Poisonous Plants, including *D. glaucum.* Another poisonous plant of this family is the pasque flower (*Anemone patens var Wolfgangiana*) which is

common from Illinois, north to Manitoba, and to timber line in



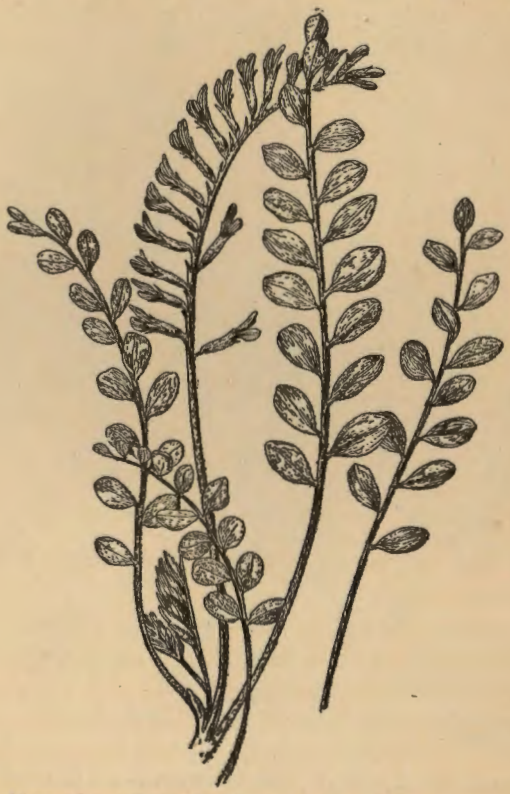
Pasque Flower. (Anemone patens var. Wolfgangiana) Drawing by Charlotte M. King.

the Rockies and British Columbia. The plant is quite a powerful irritant.

The Rose Family (*Rosaceae*) has a large number of economic plants like the pear, apple, cherry, plum, strawberry, etc. There are also a number of deadly poisonous plants. The best known of these plants are the wild cherries; one species, the choke cherry (*Prunus demissa*), is very common in the Rocky Mountains. The seed of all of the cherries and plums, as well as the bark contains a glucoside, amygdalin, which is converted into HCN. Greshoff reports this same substance in the mountain mahogany (*Cercocarpus parvifolius*). It must therefore be regarded as poisonous. Mr. H. H. Sage, a student of Iowa State College, tells me that in the Rocky Mountains it is so regarded by ranchmen. This substantiates the findings of Greshoff.

Among the *Crassulaceae* or Live Forever Family, there are a number of acrid plants, like the fleshy leaved sedums with yellow flowers common in the Rockies.

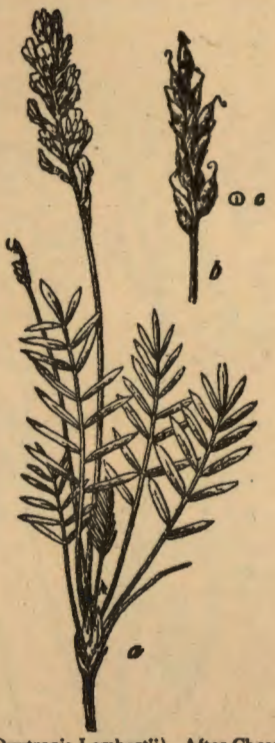
The loco weeds, which are so well known in the west, belong to the PULSE FAMILY (*Leguminosae*). Everyone knows the flowers which are irregular and papilionaceous like the flowers of the pea, bean, clover, etc. There are two species of plants more than any others which go by the name of loco weed, namely the woolly loco (*Astragalus mallissimus*), which is largely a plant of



Loco weed. (Astragalus mallissimus) Common on the plains adjacent to the Rockies Drawing by Charlotte M- King.

the foothills and plains adjacent to the Rockies. The plant has pinnately compound, hairy leaves, violet purple flowers, pod oblong, smooth, at length curved; seeds rattle in the pod when ripe. There are other species of the genus which are regarded as loco weeds, e. g. *A. Hornii,* another perennial occurring from southern Utah to California; other species occur in the Rockies. The stemless loco weed (*Oxytropis Lambertii*) is a perennial,

nearly stemless with numerous tufts of short stems coming from a hard and thick rootstock. The flowers occur in racemes and are purple or violet. There are other species of the genus which are called loco weeds. In Montana, according to Dr. Wilcox, the *Oxytropis spicatus* is regarded as the loco weed, while



Stemless loco weed. (Oxytropis Lambertii) After Chesnut, U. S. Dept. of Agr.

in Colorado it is usually the *Astragalus*. Locoed sheep are exceedingly difficult to herd, straying away from the herd. There is hallucination, defective eye sight, when the animals acquire a taste for the plant it refuses other food, and there is great emaciation, sunken eyeballs, lusterless hair, feeble movements and death.

Loco disease is not peculiar to North America, the same disease occurs in Australia and South Africa. The plants causing this trouble are closely related to the American loco weeds. The U. S. Department of Agriculture has attributed the poisoning

A species of Camas. (Zygademus sp.) —Bulletin Nevada Agriculture Experiment Station

to barium salts taken up by the plant. Some investigators report alkaloids. It has not, however, been settled as to the nature of the poisonous substance. Loco weeds are not the only poisonous plants in the family. Mention should be made of the lupines, of which there are many species in the Rocky Mountains; the rattlebox (*Crotalaria sagittalis*) which occurs from Dakota to Texas to Connecticut; the black locust (*Robinia Pseudacacia*) which is commonly planted in eastern North America; another species is common from New Mexico to Colorado, the *R. neo mexicana.* On the whole the Pulse Family contains many poisonous plants; some of the most deadly poisonous plants known, and yet there are many valuable plants like the clover, alfalfa, bean, pea, etc.

Everyone is, of course, familiar with the poison ivy (*Rhus Toxicodendron*) with three leaflets, which occurs from the Atlantic to the footholls of the Rockies, to Salt Lake City, and the western *Rhus diversibola* with rounded leaflets. The form of poisoning they cause is known as dermatitis.

The most poisonous plant in North America is the Cowbane (*Cicuta maculata*). In the northwest and on the Pacific Coast there are several others species. The flowers are white and occur in umbels, pinnately compound leaves, and fleshy thickened roots. The Oregon hemlock is *C. vagans.* These plants are poisonous alike to live stock and man. These plants grow in low, swampy grounds. Another plant of the family is poison hemlock (*Conium maculatum*) with white flowers, spotted stem, and odor of mice. Contains the alkaloid coniine. It will be impossible to mention many more of the poisonous plants of interest to the forester, suffice it to say that there are several in the Nightshade Family (*Solanaceae*), like three-flowered nightshade (*Solanum triflorum*) and black henbane (*Hyoscyamus niger*). Of the Sunflower Family (*Compositae*); Sneezeweed (*Helenium Hoopesii*), etc.

I should like to refer those who may be interested in this subject to my Manual of Poisonous Plants.*

I shall be glad at all times to receive notes on poisoning. In order to make the matter less difficult, I have appended the prominent symptoms of a few poisonous substances with treatment.

*—L. H. Pammel A manual of poisonous Plants nearly 1000 pages with illustration of the more important poisonous plant may be obtained by writing the author.